MODERNIZING U.S. STRATEGIC OFFENSIVE FORCES: COSTS, EFFECTS, AND ALTERNATIVES

The Congress of the United States
Congressional Budget Office

NOTES

Unless otherwise indicated, all years referred to in this report are fiscal years.

Unless otherwise indicated, all dollar amounts are expressed in constant fiscal year 1988 budget authority dollars.

Life-cycle costs exclude funds that have already been appropriated.

Details in the text, tables, and figures of this report may not add to totals because of rounding.

PREFACE

The Administration announced its plan to modernize all parts of the United States strategic deterrent in October 1981. Since then it has substantially completed one wave of procurement of strategic offensive forces, encompassing all legs of the triad: land-based and sea-based intercontinental ballistic missiles plus long-range bombers. Plans for a second wave of procurement are under way and may well cost more than the first. The Administration's budget requests show that spending for strategic forces will grow more rapidly than that for the total defense budget.

By many commonly used measures, the Administration's program has added significantly to the capability of U.S. strategic forces and will continue to do so. However, not everyone agrees with the priorities and goals of the Administration's program. The constrained budget outlook is likely to sharpen debate about the relative share of the nation's future resources devoted to defense and about allocations within the defense budget for strategic forces. Reductions in the defense budget over the past two years have been accommodated without any fundamental change in planned strategic programs. If the budget trend continues, however, Congress may be faced with more difficult choices, possibly affecting the structure of U.S. strategic forces for many years.

This study analyzes the effects of the Administration's plan for modernizing the strategic offensive forces and discusses alternatives that would reduce costs. The study was requested by the House Committee on Armed Services. In keeping with the Congressional Budget Office's mandate to provide objective analysis, the study contains no recommendations.

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November 1987

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SUMMARY

United States strategic forces are primarily intended to deter the Soviet Union from initiating a nuclear war. To do so, U.S. policy calls for them to be able to survive a Soviet nuclear strike and retaliate in an appropriate and timely manner. Since the 1960s, the Soviets have upgraded and significantly expanded the capabilities of their strategic forces. The Administration believes that in response the United States must increase not only the numbers of its forces and their chance of surviving a Soviet strike, but also their destructive capability, endurance, and responsiveness.

Indeed, modernizing and upgrading the strategic forces and their associated command and control has been one of the highest priorities of the Administration's defense program. The Administration has already substantially completed one wave of strategic procurement, including the first 50 MX missiles to be placed in existing silos, B-1B bombers, and the majority of new Trident submarines. When fully fielded, these systems will increase available strategic warheads by roughly 25 percent above 1981 funded warhead levels. The Administration plans a second wave of procurement that may well cost more than the first. The broad scope of the program, coupled with its substantial cost and limits on Congressional willingness to increase total defense spending, is likely to generate sharp debate.

THE ADMINISTRATION'S MODERNIZATION PLAN

The Administration's modernization plan would continue procurement of several major weapons systems through the mid-to-late 1990s. While not all the details of the plan are available publicly and, in some cases, ultimate force levels have not been determined, this study assumes the modernization plan includes:

- Deployment beginning in the early 1990s of 500 new, single-warhead, small intercontinental ballistic missiles (SICBMs) in a mobile basing mode;

- Deployment by the mid-1990s of 50 MX missiles on railroad cars;

- Procurement in the early-to-mid 1990s of 132 Advanced Technology Bombers ("stealth bombers") designed to penetrate the Soviet Union;

- Procurement by the early 1990s of about 3,200 air-launched cruise missiles (ALCMs) with about 1,500 of those being Advanced Cruise Missiles (ACMs) that reportedly have greater range than earlier versions and are harder to detect with air defense radars (cruise missiles are essentially small, unmanned aircraft that are carried near Soviet airspace by manned aircraft, initially by B-52 bombers and later by both B-52 and B-1B bombers);

- Procurement through the mid-1990s of about 1,600 new nuclear short-range attack missiles (SRAM II) to replace the current aging missiles carried on penetrating bombers;

- Continued procurement through 1993 of Trident submarines at the current rate of one per year to a total of 20, and deployment by 1996 on most Trident submarines of the new, larger, and more accurate Trident II (D-5) missile.

GOALS OF CONTINUED MODERNIZATION

Three key goals seem to characterize the Administration's plan for continued modernization, and provide a useful framework for evaluating the effects of planned programs and alternatives to them. The goals did not originate with this Administration, but it has clearly put the greatest emphasis on them and invested most in them of any recent Administration. Different views exist, however, as to what should be the proper emphasis for the U.S.'s deterrent force posture.

Supporting a Survivable Triad

This goal addresses a long-standing and key feature of the U.S. strategic force posture. A triad of strategic systems (land-based missiles,

submarine-based missiles, and bombers), a portion of each able to survive a Soviet attack, ensures that U.S. forces will be able to retaliate. Facing three types of forces, the Soviets cannot concentrate their attack, or their research dollars, on destroying any one. Also, one type of system would sometimes help the others survive an attack.

Improving U.S. Capability to Respond Flexibly to a Soviet Attack

This goal reflects the belief that the Soviets most value their tools of control and power--their military forces and leadership facilities--most of which are hardened against nuclear effects. Effective deterrence, according to this belief, requires the ability to survive a possibly extended conflict, and to retaliate against these selected targets in a flexible and timely manner. This ability, in turn, requires increasing the survivability of U.S. command and control facilities and communications links. It also requires increasing the number of survivable "hard-target" warheads--that is, warheads able to destroy Soviet military targets hardened against a nuclear attack--particularly hard-target warheads that can reach their targets promptly (meaning within minutes rather than hours).

Maintaining a Manned Penetrating Bomber

Bombers on alert already have a high probability of surviving an initial Soviet attack on U.S. bomber bases. To penetrate Soviet airspace on a retaliatory mission, however, manned bombers must traverse an increasingly formidable array of Soviet radar systems, missiles, and airborne interceptors. Large numbers of small, air-launched cruise missiles, launched from bombers outside of Soviet airspace, can provide a great deal of flexibility and hard-target capability for the retaliatory mission and are very difficult to defend against. Nonetheless, the Administration believes that manned bombers with short-range weapons must continue to penetrate the Soviet Union to carry out missions such as locating and destroying mobile strategic systems.

EFFECTS OF MODERNIZATION ON COSTS AND GOALS

The projected balance of forces suggests that the planned U.S. buildup could move toward accomplishing these key goals despite continuing Soviet modernization and expansion of their forces. The U.S. buildup will also add substantially to costs.

Projected Balance of Forces and Administration Goals

Under the Administration's plans, the United States would maintain a survivable triad of strategic forces, one of its key goals. The leg of the triad most threatened by a Soviet attack today--land-based missiles--would be much more likely to survive because of the deployment of MX missiles and the small ICBM in mobile basing modes. The plan would also include a new manned bomber--the Advanced Technology Bomber (ATB)--thought likely to be highly successful in its ability to penetrate Soviet air defenses despite their expected improvements. Thus, another key goal would be met.

In addition, the United States would markedly increase its capability to attack hardened Soviet targets such as ICBM silos and leadership bunkers. The numbers of U.S. hard-target warheads would grow from about 4,000 today to about 9,600 by 1996 and would peak at about 11,600 when all Trident submarines are deployed. Since U.S. deterrence policy is primarily defensive, results after a Soviet attack are also important. Consider, for example, the more likely scenario of a nuclear attack preceded by friction or conventional hostility. If the United States today absorbed a Soviet attack before retaliating, it would have about 2,900 hard-target warheads, of which about 250 would be on ballistic missiles able to retaliate promptly. By 1996, however, the United States would have about 7,600 surviving hard-target warheads, of which about 3,000 would be on ballistic missiles.

Under the Administration's plans, the United States would move toward accomplishing its three key goals, although today's rough balance of pre-attack warheads could shift in favor of the Soviet Union. Today, both sides have between 10,000 and 11,000 strategic nuclear warheads. By 1996, absent arms control reductions, and assuming a moderate pace for Soviet modernization, the United States would have

about 13,000 warheads, while the Soviets could have over 17,000 warheads. Unlike the United States, much of both the current Soviet land-based and sea-based forces still have single-warhead missiles, but their newer missiles generally carry many warheads apiece.

Costs of the Plan

Meeting Administration goals will be expensive. Based on estimates from the Department of Defense (DoD) and its definition of what constitutes strategic costs--including strategic defense costs--the Administration's plan calls for spending $39.2 billion on strategic forces in 1988, and $42.1 billion in 1989. The investment portion of this total--defined as spending for research, procurement, and construction--would grow from $29.1 billion in 1988 to $31.8 billion in 1989 (see Summary Table 1). This increase represents real growth in total strategic costs of 10.1 percent in 1988 and 7.4 percent in 1989. That growth would increase the share of the DoD budget spent on strategic forces from 11.9 percent in 1987 to 13.4 percent in 1989, raising concerns that the United States is spending an increasing share of its defense budget on strategic forces, perhaps at the expense of nonnuclear or conventional forces.

The share of the defense budget for strategic forces could continue to rise beyond 1989. Several major offensive force modernization programs--such as the SICBM and ATB--will be moving from the relatively less expensive stage of research into procurement during this period. Though not the focus of this study, costs for the Strategic Defense Initiative are also expected to increase greatly. Beyond 1989, however, DoD estimates of strategic costs are not publicly available.

Effects of Recent Arms Control Proposals

Potential limits on strategic offensive weapons--at least those agreed to in principle at the Reykjavik Summit in October 1986--need not substantially affect the Administration's modernization plan or its cost. Even so, these limits could lead to mutual reductions in strategic forces and as a result yield important benefits, including reductions in long-run costs such as having to replace fewer forces.

The limits agreed to in principle at Reykjavik--generally characterized as 50 percent reductions in strategic force levels--call for reductions over a five-year period to a ceiling of 6,000 warheads on 1,600 strategic nuclear delivery vehicles. Many areas of disagreement remain, a principal one being the U.S. Strategic Defense Initiative. These areas of disagreement prevented the United States and the Soviet Union from reaching any decisive agreement at Reykjavik, but the framework of overall limits on offensive forces will likely be the basis for any future accord. With the exception of reducing deployment of air-launched cruise missiles well below planned levels, and assuming limits on the number of warheads tested on the Trident II missile, the Administration's modernization program could be completed within these overall ceilings. Older systems, however, would have to be retired sooner than under current plans. Operating

SUMMARY TABLE 1. BUDGET FOR STRATEGIC FORCES
(In billions of 1988 dollars)

	1987	1988	1989
DoD Total Obligational Authority (TOA) a/	298.1	304.1	313.1
Strategic forces	35.6	39.2	42.1
(Investment) b/	(24.9)	(29.1)	(31.8)
Real growth (in percents)	n.a.	10.1	7.4
Strategic share of TOA (in percents)	11.9	12.9	13.4

SOURCE: Congressional Budget Office based on Department of Defense data.

NOTES: n.a. = not applicable.

Amounts are taken from Department of Defense, *Five-Year Defense Plan.* Includes supplemental appropriation in 1987. The budget for strategic forces includes funds for both offensive strategic forces and defensive strategic forces.

a. Total obligational authority (TOA) is a DoD financial term that measures the value of the direct defense program for a fiscal year. Net offsetting and trust fund receipts are not deducted from TOA as they are from budget authority (BA). They are collections from the public that arise out of the business-type or market-oriented activities of the government and are deposited in receipt accounts. In recent times, the differences between TOA and BA have been small.

b. Investment includes Procurement; Research, Development, Test and Evaluation; and Military Construction.

costs would decrease as older systems were retired, and savings could eventually average $2 billion a year. One-time costs to dismantle older systems would offset near-term savings. Cost savings could be greater if the United States chose to curtail modernization rather than accelerate retirement of existing systems. Regardless of the United States' approach, however, long-run cost savings could be substantial if fewer systems have to be replaced.

Of more far-reaching impact are the more comprehensive proposals by the United States, such as eliminating all ballistic missiles or more specific proposals such as forbidding mobile land-based missiles. The United States has reached, however, no general agreement with the Soviets on such limits. A comprehensive analysis of the pros and cons of potential arms limits is not the focus of this analysis.

ALTERNATIVES TO THE ADMINISTRATION'S PLAN

Without far-reaching arms agreements, the Administration's strategic plans could lead to widespread increases in strategic force capabilities and large real cost growth at a time when the Congressional budget resolution anticipates real declines in total defense spending. Thus, this study considers four alternatives to the Administration's plan. All of the options assume the triad would be continued. Some analysts have advocated fundamental changes in this posture, such as relying solely on the sea-based forces. Since such changes would retain only a portion of the current forces, they would certainly be less expensive. However, the overwhelming majority of policymakers have consistently decided that the protection afforded by a triad of forces is important for deterrence.

Alternative I: Do Not Backfit Trident Submarines

The first eight Trident submarines procured in the 1970s were equipped with the Trident I missiles, but the Administration plans to replace that missile with the new, larger, and more accurate Trident II missile under a backfit program. This alternative would eliminate the modification and backfit of the eight Trident submarines. Only the last 12 of the 20 Trident submarines would be deployed with Trident II

missiles, reducing Trident II procurement from 844 missiles to 660. The first backfit is not planned until 1991, but the Congress could indicate its intent to pursue this option by deleting funds in the 1988 budget for advance planning and procurement.

Effects on the Administration's Modernization Goals. The goal of increasing U.S. prompt hard-target retaliatory capability could be adversely affected by this option, though much capability would remain. The actual effect would depend on the mix of Mark 5 and Mark 4 warheads the Navy plans to have on the Trident II missiles. Only if the planned ratio of Mark 5 to Mark 4 warheads were greater than 60 to 40 would there be any reduction of hard-target warheads at all under this option. The greatest reduction in warheads would occur if all Trident II missiles were planned to carry the Mark 5 warhead. In this case, after a Soviet attack in the year 2000 (with strategic warning), the United States would have about 1,500 fewer prompt hard-target warheads under this option than under the Administration's plan, a reduction of about 12 percent (see Summary Table 2). The United States, however, would still have about 3,000 warheads able to survive a Soviet attack and retaliate promptly, compared with virtually none today. About 5,000 hard-target warheads on bombers would also be available to retaliate, though not promptly.

Some analysts argue that this substantial level of hard-target capability, though reduced below Administration plans, would deter a Soviet attack on military targets. If so, reducing "excess" hard-target warheads--which the Soviets may view as weapons intended to be used by the United States in a first-strike of its own--could increase crisis stability.

Savings. Savings would be relatively modest under this alternative. About $5.8 billion in investment costs would eventually be saved (see Summary Table 2). Investment savings would amount to only $0.8 billion over the next five years and only about $0.2 billion in 1988 and 1989, the two years of the current budget. Some increases in operating costs could make near-term savings more modest.

SUMMARY TABLE 2. COSTS AND EFFECTS OF ADMINISTRATION'S STRATEGIC PLAN AND ALTERNATIVE APPROACHES

	Investment Costs (In billions of 1988 budget authority dollars)				Hard-Target Warheads in Year 2000 a/
	Budget Costs		1988-		
	1988	1989	1992	Total	
Administration's Plan	29.1	31.8	n.a.	n.a.	12,530
Savings/Changes Under:					
Alternative I: Do Not Backfit Trident Submarines	b/	0.2	0.8	5.8	-1,536 c/
Alternative II: Limit Further Land-Based Modernization					
No SICBM d/	2.2	2.3	18.0	37.4	-500
No Rail MX e/	0.6	1.2	8.4	8.4	-500
Alternative III: Cancel Manned Penetrating Bomber	n.a.	n.a.	n.a.	Over 40	+495
Alternative IV: Delay Further Modernization (Including ATB, SICBM, Rail MX, SRAM II) f/	1.7	2.4	17.9	n.a.	-424

SOURCE: Congressional Budget Office computations based on budget data.

NOTE: n.a. = not available.

a. These numbers represent inventory counts of ballistic missiles plus bomber weapons.

b. Less than $20 million.

c. This number represents the upper bound of possible reductions in hard-target warheads under this option since it is compared with a baseline in which all Trident II missiles carry the Mark 5 warhead.

d. The SICBM Selected Acquisition Report (SAR) does not include $1.6 billion (in current dollars) of projected savings in research and development costs. The Air Force has also identified significant production cost savings. These savings are currently being coordinated with the Office of the Secretary of Defense.

e. The MX Rail Garrison SAR excludes cost of production missiles, operational test and evaluation missiles, and initial spares for the Rail Garrison Basing Mode.

f. Savings from delaying the ATB are not available and are therefore not included.